UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,303	03/19/2004	Hideaki Tsuda	3408.70081	7833

7590 02/27/2007

Patrick G. Burns, Esq.
GREER, BURNS & CRAIN, LTD.
Suite 2500
300 South Wacker Dr.
Chicago, IL 60606

EXAMINER	
HON, SOW FUN	
ART UNIT	PAPER NUMBER
1772	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/804,303	TSUDA ET AL.	
	Examiner	Art Unit	
	Sow-Fun Hon	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45 and 47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25,34-41 and 47* is/are rejected.

7)☒ Claim(s) *26-33,42-45* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/22/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/04/06 has been entered.

Response to Amendment

Withdrawn Rejections

2. The 35 U.S.C. 103(a) rejections of claims 1-29, 34-43 over the primary combination of Wakita in view of Takiguchi, are withdrawn due to Applicant's amendment dated 012/04/06.

New Rejections

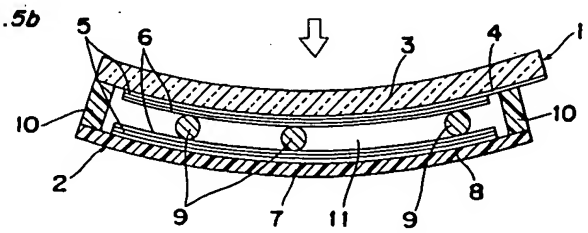
Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-3, 7-15, 22-25, 40-41, 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakita (US 5,307,190) in view Ogawa (US 5,186,986).

Regarding claims 1-3, Wakita teaches a liquid crystal panel (column 5, lines 66-68) having a liquid crystal layer (11, column 7, lines 16-17) sandwiched between a pair of substrates (glass plate 3 and plastic resin film 7, column 7, lines 1-10), wherein an outer surface of at least one of the pair of substrates is curved, specifically the upper surface. See Fig. 5b shown below.

Fig.5b



While Wakita teaches that the liquid crystal layer comprises a liquid crystal and a silane coupler resin with a structural part inherently adhered to an upper surface of one of said pair of substrates (alignment layers 6 may be thin layers of silane coupler, column 7, lines 10-13, wherein a silane coupler is a well-known adhesive), in the sense that both of the two liquid crystal layer contacting surfaces have thin-film, inherently adhered, structural parts, as defined in Applicant's specification (page 19, lines 1-10), Wakita fails to disclose that the silane coupler resin is cross-linked, wherein the cross-linked resin includes a cross-linked structural part, which is a cross-linked structural part adhered to an upper surface of one of pair of substrates, and a rising terminal part, which is a terminal part rising from the upper surface toward said liquid crystal.

However, Ogawa teaches a liquid crystal display panel (column 1, lines 10-15) having a liquid crystal layer sandwiched between a pair of substrates (liquid crystal 20 is injected into the space between the substrates, column 7, lines 15-20), wherein: said

liquid crystal comprises a liquid crystal and silane coupler resin (liquid crystal alignment film which comprises silane-based surface active agent containing polymerizable groups, column 2, lines 25-31) which is cross-linked (column 2, lines 40-45), said cross-linked resin includes an adhered cross-linked structural part which is a cross-linked structural part adhered to the surface of the substrate (effect crosslinking thereof, thereby effecting alignment and fixing of the adsorbed silane-based surface active agents, column 2 lines 40-44, adsorbed on the substrate surface, column 2, lines 25-35), and a rising terminal part, which is a terminal part rising from the surface toward the liquid crystal (long carbon chains 3a of the monomolecular adsorbed film to control alignment of the liquid crystal molecules 5, column 5, lines 30-36. See Figure 2 shown below).

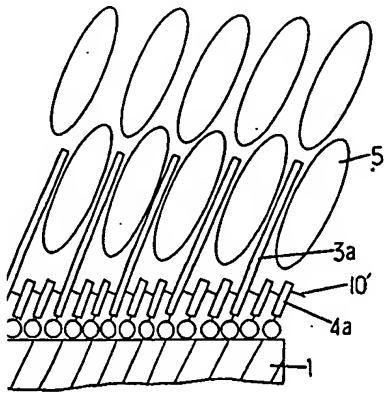


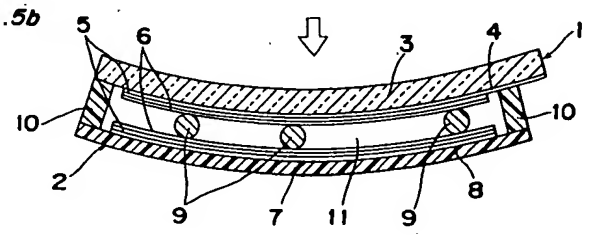
Figure 2

Ogawa teaches that the cross-linked silane coupler resin which includes an adhered cross-linked structural part, which is a cross-linked structural part adhered to the surface of the substrate, and a rising terminal part, which is a terminal part rising from the surface toward the liquid crystal, is used for the purpose of providing excellent control of the alignment of the liquid crystal (column 6, lines 20-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the cross-linked silane coupler resin of Ogawa, which includes an adhered cross-linked structural part, which is a cross-linked structural part adhered to the surface of the substrate, and a rising terminal part, which is a terminal part rising from the surface toward the liquid crystal, as the silane coupler resin in the liquid crystal layer of the liquid crystal panel of Wakita, in order to provide excellent control of the alignment of the liquid crystal, as taught by Ogawa.

Regarding claim 7, Wakita teaches a liquid crystal panel (column 5, lines 66-68) having a liquid crystal layer (11, column 7, lines 16-17) sandwiched between a pair of substrates (glass plate 3 and plastic resin film 7, column 7, lines 1-10), wherein an outer surface of at least one of the pair of substrates is curved, specifically the upper surface. See Fig. 5b shown below. Wakita teaches that the thickness of plastic resin film substrate 7 is not more than 1/18 of the thickness of the glass plate substrate 3 (film thickness less than 0.3 mm, glass thickness greater than 0.55 mm, column 10, lines 24-25), which is within the claimed range of not more than ½.

Fig.5b



While Wakita teaches that the liquid crystal layer comprises a liquid crystal and a silane coupler resin with a structural part inherently adhered to an upper surface of one

of said pair of substrates (alignment layers 6 may be thin layers of silane coupler, column 7, lines 10-13, wherein a silane coupler is a well-known adhesive), in the sense that both of the two liquid crystal layer contacting surfaces have thin-film, inherently adhered, structural parts, as defined in Applicant's specification (page 19, lines 1-10), Wakita fails to disclose that the silane coupler resin is cross-linked, wherein the cross-linked resin includes a cross-linked structural part, which is a cross-linked structural part adhered to an upper surface of one of pair of substrates, and a rising terminal part, which is a terminal part rising from the upper surface toward said liquid crystal.

However, Ogawa teaches a liquid crystal display panel (column 1, lines 10-15) having a liquid crystal layer sandwiched between a pair of substrates (liquid crystal 20 is injected into the space between the substrates, column 7, lines 15-20), wherein: said liquid crystal comprises a liquid crystal and silane coupler resin (liquid crystal alignment film which comprises silane-based surface active agent containing polymerizable groups, column 2, lines 25-31) which is cross-linked (column 2, lines 40-45), said cross-linked resin includes an adhered cross-linked structural part which is a cross-linked structural part adhered to the surface of the substrate (effect crosslinking thereof, thereby effecting alignment and fixing of the adsorbed silane-based surface active agents, column 2 lines 40-44, adsorbed on the substrate surface, column 2, lines 25-35), and a rising terminal part, which is a terminal part rising from the surface toward the liquid crystal (long carbon chains 3a of the monomolecular adsorbed film to control alignment of the liquid crystal molecules 5, column 5, lines 30-36. See Figure 2 shown on the next page).

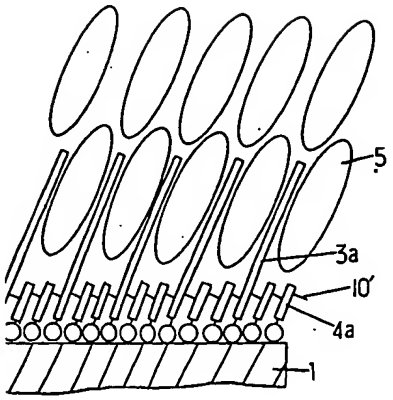


Figure 2

Ogawa teaches that the cross-linked silane coupler resin which includes an adhered cross-linked structural part, which is a cross-linked structural part adhered to the surface of the substrate, and a rising terminal part, which is a terminal part rising from the surface toward the liquid crystal, is used for the purpose of providing excellent control of the alignment of the liquid crystal (column 6, lines 20-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the cross-linked silane coupler resin of Ogawa, which includes an adhered cross-linked structural part, which is a cross-linked structural part adhered to the surface of the substrate, and a rising terminal part, which is a terminal part rising from the surface toward the liquid crystal, as the silane coupler resin in the liquid crystal layer of the liquid crystal panel of Wakita, in order to provide excellent control of the alignment of the liquid crystal, as taught by Ogawa.

Regarding claims 8-9, Wakita teaches that the thickness of plastic resin film substrate 7 is not more than 1/18 of the thickness of the glass plate substrate 3 (film thickness less than 0.3 mm, glass thickness greater than 0.55 mm, column 10, lines 24-25), which is within the claimed range of not more than ½.

Regarding claims 10-11, 34, Wakita teaches that the thickness of at least one of the pair of substrates is less than 300 μm (0.3 mm, column 10, lines 24-25), which is within the claimed range of from 100 to 500 μm.

Regarding claims 12-15, 35-36, Wakita teaches that the material of one of the pair of substrates is different from that of the other substrate, wherein said pair of substrates comprises a glass substrate and a plastic substrate (glass plate 3 and plastic resin film 7, column 7, lines 1-10).

Regarding claims 22-25, 40-41, Wakita fails to teach that the silane coupler resin composition comprises one or more first compounds having a cross-linkable structural part, and a hydrophobic terminal part with a straight-chain section having three or carbon atoms (hydrophobic, long-chain terminal part), let alone that the cross-linkable structural part of the one or more first compounds comprises a polar-group structural part.

However, Ogawa teaches that the silane coupler resin composition comprises one or more first compounds having a cross-linkable structural part, and a hydrophobic terminal part with a straight-chain section having three or carbon atoms (hydrophobic, long-chain terminal part). See silane coupler compound shown below (long carbon chain compound 4, column 4, lines 51-60), wherein the –Si- is the polar group structural part.

$$CH_3—(CH_2)_8—HC=CH—(CH_2)_2—SiCl_3$$

Regarding claim 47, Wakita teaches that the adhered structural part forms a thin film on the upper surface of the one of the pair of substrates (alignment layers 6 may be

thin layers of silane coupler, column 7, lines 10-13, wherein a silane coupler is a well-known adhesive). Thus, the adhered cross-linked structure part of cross-linked resin in the liquid crystal layer of Wakita in view of Ogawa, forms a thin film on the upper surface of the one of the pair of substrates.

4. Claims 6, 16-19, 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakita in view of Ogawa as applied to claims 1-3, 7-15, 22-25, 40-41, 47 above, and further in view of Yamaguchi (US 6,801,286).

Wakita in view of Ogawa teaches the liquid crystal layer which comprises a liquid crystal and a cross-linked resin which includes an adhered cross-linked structural part which is a cross-linked structural part adhered to an upper surface of one of the pair of substrates, and a rising terminal part, which is a terminal part rising from said upper surface toward the liquid crystal, as discussed above.

Regarding claim 6, Wakita in view of Ogawa fails to teach that the curved surface of the upper surface of one of the pair of substrates is composed of a plurality of concavities and convexities.

However, Yamaguchi teaches that a plurality of concavities and convexities (Fig. 5) may be used to form oblique electric fields for the purpose of tilting the liquid crystal molecules (protuberance 6, column 4, lines 1-5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided the curved surface of the upper surface of one of the pair of substrates of the liquid crystal panel of Wakita in view of Ogawa,

with a plurality of concavities and convexities, to form oblique electric fields, in order to tilt the liquid crystal molecules, as taught by Yamaguchi.

Regarding claims 16-19, 37-38, Wakita in view of Ogawa fails to teach that the liquid crystal panel does not have an alignment control film, or that the liquid crystal tilts while the tilting direction is regulated by slits of an electrode or electrodes when voltage is applied.

However, Yamaguchi teaches that slits of an electrode can positively be used for the purpose of controlling the alignment (column 7, lines 34-41) and hence the tilt of the liquid crystal when voltage is applied (column 4, lines 30-40), in which case, there is no need for a film whose sole function is alignment control.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used slits in the electrodes of the liquid crystal panel of Wakita in view of Ogawa, in order to provide the desired tilt of the liquid crystal when voltage is applied, as taught by Yamaguchi.

5. Claims 20-21, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakita in view of Ogawa as applied to claims 1-3, 7-15, 22-25, 40-41, 47 above, and further in view of Lowe (US 6,055,031).

Wakita in view of Ogawa teaches the liquid crystal panel comprising the liquid crystal, as discussed above. In addition, Wakita teaches that liquid crystal panel is used in a display (column 1, lines 6-11). Wakita in view of Ogawa fails to teach that the liquid crystal has negative dielectric anisotropy.

However, Lowe teaches that the advantage of liquid crystal with negative dielectric anisotropy over liquid crystal with positive anisotropy is that the negative anisotropy liquid crystal cell is normally white and maximum reflectivity is obtained at zero applied voltage, for the purpose of providing maximum display contrast ratio (column 6, lines 41-51) for the liquid crystal display (column 1, lines 12-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used liquid crystal with negative dielectric anisotropy as the liquid crystal in the liquid crystal panel of Wakita in view of Ogawa, to provide a white cell and maximum reflectivity at zero applied voltage, in order to obtain maximum contrast ratio for the liquid crystal display, as taught by Lowe.

6. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakita in view of Ogawa as applied to claims 1-3, 7-15, 22-25, 40-41, 47 above, and further in view of Wachi (US 6,819,375).

Wakita in view of Ogawa teaches the liquid crystal panel as discussed above. fails to teach a filter layer wherein the liquid crystal layer-contacting surface is the surface of the filter layer.

However, Wachi teaches a liquid crystal panel (column 1, lines 9-12) wherein the color filters transmit light of a particular wavelength and are liquid crystal layer-contacting surfaces which also control liquid crystal alignment (have surface profiles which define a state of alignment of the liquid crystal, column 2, lines 26-35). Wachi teaches that providing a filter layer wherein the liquid crystal layer-contacting surface is

the surface of the filter layer, is for the purpose of eliminating problems caused by rubbing an alignment film, and of reducing production costs (column 3, lines 16-27).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a filter layer, wherein the liquid crystal layer-contacting surface is the surface of the filter layer which also controls liquid crystal alignment, as the alignment layer of Wakita in view of Ogawa, in order to eliminate problems caused by a rubbed alignment film, and to reduce production costs, as taught by Wachi.

Allowable Subject Matter

7. Claims 26-33, 42-45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The cited prior art of record fail to teach the structure of the at least one compound represented by formula (1) or (2). There is no motivation to combine US 5,307,190 with US 5,496,497 since the cross-linked resin in '190 provides alignment control for the liquid crystal while the cross-linked resin in '497 does not.

Response to Arguments

8. Applicant's arguments with respect to claims 1-29, 34-43 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hon

Sow-Fun Hon

02/17/07

RENA DYE
SUPERVISORY PATENT EXAMINER

Tech Center 1700